GESTRA®

Compact System

NRGS 11-2
NRGS 16-2

spector compact

EN
English

Original Installation Instructions

810366-05

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Important Notes

Usage for the intended purpose

Use the compact system NRGS 11-2, NRGT 16-2 as water level controller / limiter in, e. g, steam boilers and (pressurised) hot water installations as well as in condensate and feedwater tanks.

Safety note

The equipment must only be installed and commissioned by qualified and competent staff.
Retrofitting and maintenance work must only be performed by qualified staff who - through adequate training - have achieved a recognised level of competence.

Danger

When loosening the compact system steam or hot water might escape!
This presents the risk of severe scalding all over the body!
It is therefore essential not to dismantle the equipment unless the boiler pressure is verified to be 0 bar.

The equipment becomes hot during operation.
Risk of severe burns to hands and arms.
Before carrying out installation and maintenance work make sure that the equipment is cold.

The terminal strip of the NRGS 11-2, NRGS 16-2 is live during operation.
This presents the danger of electric shock!
Cut off power supply before mounting or removing the housing cover!

Attention

The name plate specifies the technical features of the equipment. Do not commission or operate any item of equipment that does not bear its specific name plate.

LV (Low Voltage) Directive and EMC (Electromagnetic Compatibility)

The equipment meets the requirements of the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

ATEX (Atmosphère **Ex**plosible)

According to the European Directive 2014/34/EU the equipment must **not** be used in potentially explosive areas.

Note on the Declaration of Conformity / Declaration by the Manufacturer CE

For details on the conformity of our equipment according to the European Directives see our Declaration of Conformity or our Declaration of Manufacturer.

The current Declaration of Conformity / Declaration of Manufacturer are available in the Internet under www.gestra./de/documents or can be requested from us.

Explanatory Notes

Scope of supply

NRGS 11-2
1 Compact system NRGS 11-2
1 Joint ring D 33 x 39 DIN 7603-1.4301, bright annealed
1 Installation manual

NRGS 16-2
1 Compact system NRGS 16-2
1 Joint ring D 33 x 39 DIN 7603-1.4301, bright annealed
1 Installation manual

Function

The NRGS 11-2, NRGS 16-2 is a compact-type system consisting of a level electrode with four tips and an integrated level switching controller. For the correct functioning of the equipment the water must have a minimum conductivity of >0.5 µS/cm at 25 °C.

The length of the individual electrode tips determines the switchpoints for the respective water levels.

The equipment monitors the water level by sensing whether the electrode tips are exposed or immersed and - by energizing or de-energizing the controller output contact - switches the feedwater pump on or off. The LED for pump is illuminated when the equipment switches the feedwater pump on.

When the water level falls below the low level, the two MIN electrode tips are exposed and after the de-energizing delay the equipment switches the MIN output contacts. The safety circuit for the heating will be opened after the de-energizing delay and the two MIN LED are illuminated.

A MIN alarm can be simulated by pressing the test button.

The heating will be switched off and interlocked. To reset the interlock the MIN electrode tips must enter the water again and the button “Reset” must be pushed.

Technical data

NRGS 11-2, NRGS 16-2

Type approval no.
TÜV · WR/WB · xx-392

Service pressure
NRGS 11-2: 6 bar at 159 °C, NRGS 16-2: 32 barg at 238 °C

Mechanical connection
Screwed G 1, EN ISO 228-1

Materials

Terminal box	3.2161 G AlSi8Cu3
Sheath	1.4301 X5 CrNi18-10
Screw-in body	1.4571 X6 CrNiMoTi17-12-2
Electrode tips	1.4571 X6 CrNiMoTi17-12-2
Insulation	PTFE
Spacer disc	PTFE

Electrode tips
Lengths available: 500, 1000, 1500 mm

Technical Data - continued -

NRGS 11-2, NRGS 16-2 - continued -

Supply voltage
230 V +/– 10%, 50/60 Hz
115 V +/– 10%, 50/60 Hz
24 V +/– 10%, 50/60 Hz (optional)

Power consumption
5 VA

Fuse
external 63 mA , slow-blow, at 230 V and 115 V,
external 150 mA slow-blow at 24 V.
internal thermal fuse T_{max} = 102 °C

Response sensitivity (electrical conductivity of water at 25 °C)
>0.5 ...< 1000 µS/cm or >10 ...< 10 000 µS/cm (switch-selectable)

Electrode voltage
10 V_{ss}

Output
2 volt-free relay contacts, 8 A 250 V AC / 30 V DC cos ϕ = 1
De-energizing delay: 3 sec. (MIN alarm)
1 volt-free relay contact, 8 A 250 V AC / 30 V DC cos φ = 1
(e. g. feedwater pump ON).
Provide inductive loads with RC combinations according to manufacturer's specification to ensure interference suppression.

Indicators and adjustors
2 red LEDs for signalling "Low water level", 1 green LED for "Pump ON".
1 four-pole code switch for selecting the response sensitivity.
1 push button for testing the MIN (low-level) alarm.
1 Push button "Reset"

Cable entry
Cable gland with integral cable clamp
M 16 (PG 9), M 20 (PG 16)

Protection
IP 65 to DIN EN 60529

Weight
Approx. 0.8 kg

Ambient temperature
when system is switched on: 0 ° ... 70 °C, during operation: -10 ... 70 °C

Transport temperature
–20 ... +80 °C (<100 hours), defrosting time of the de-energized equipment before it can be put into operation: 24 hours.

Storage temperature
–20 ... +70 °C, defrosting time of the de-energized equipment before it can be put into operation: 24 hours.

Relative humidity
max. 95 %, no moisture condensation

Technical Data - continued -

Name plate / marking

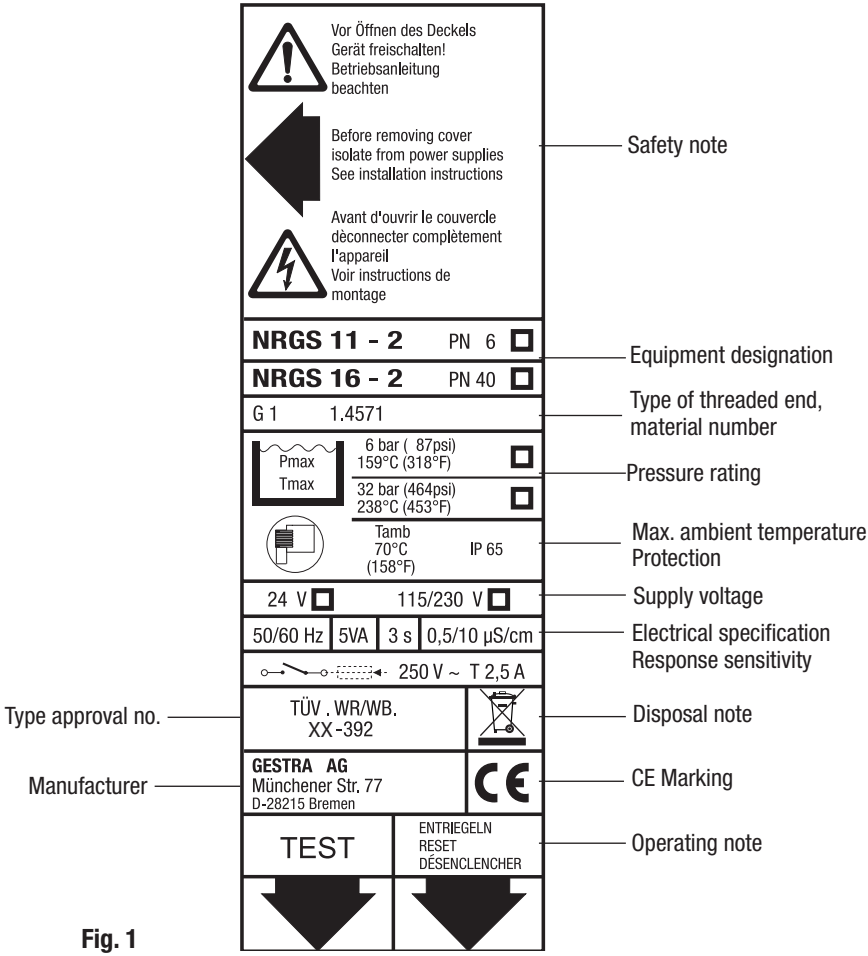

Fig. 1

Dimensions

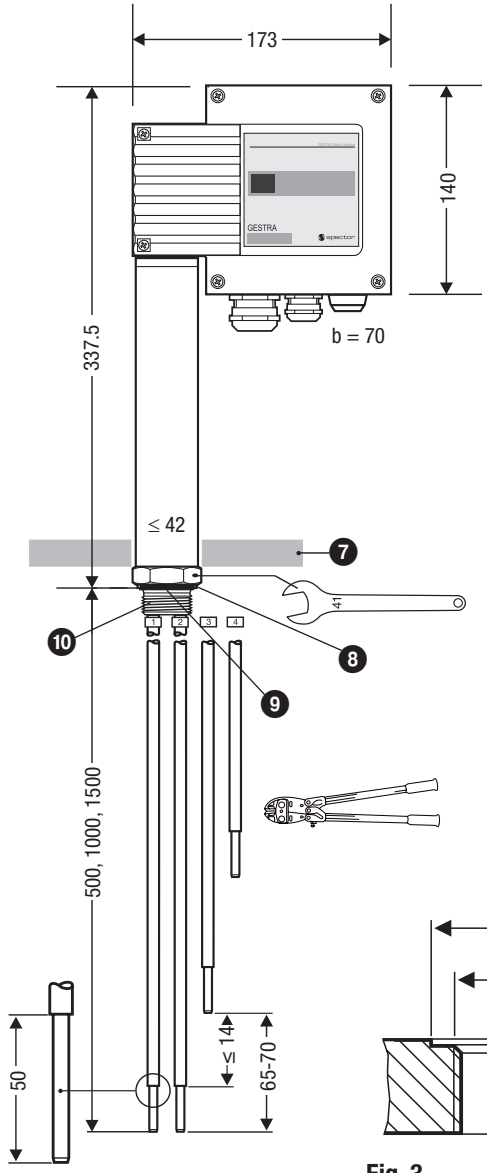

Fig. 2

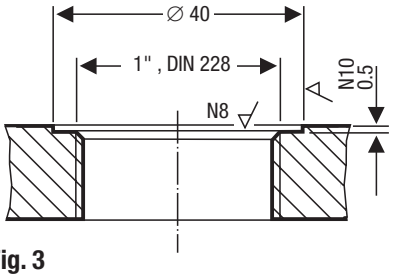

Fig. 3

Functional Elements

NRGS 11-2, NRGS 16-2

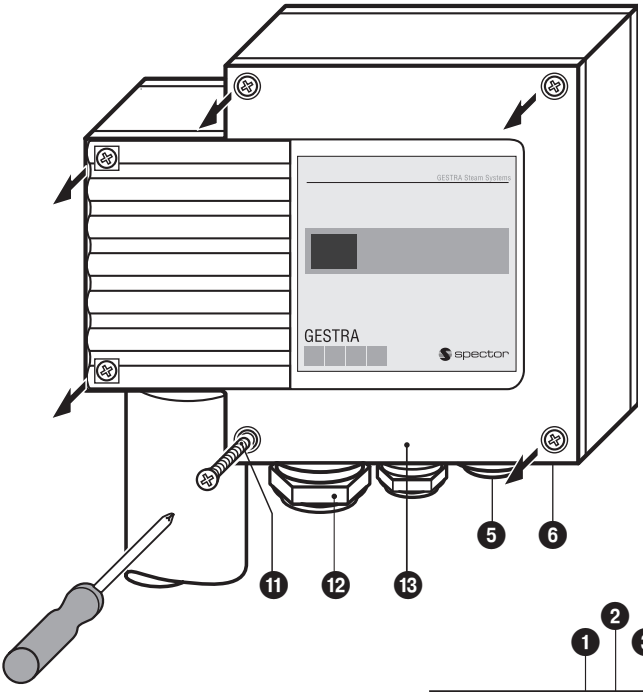

Fig. 4

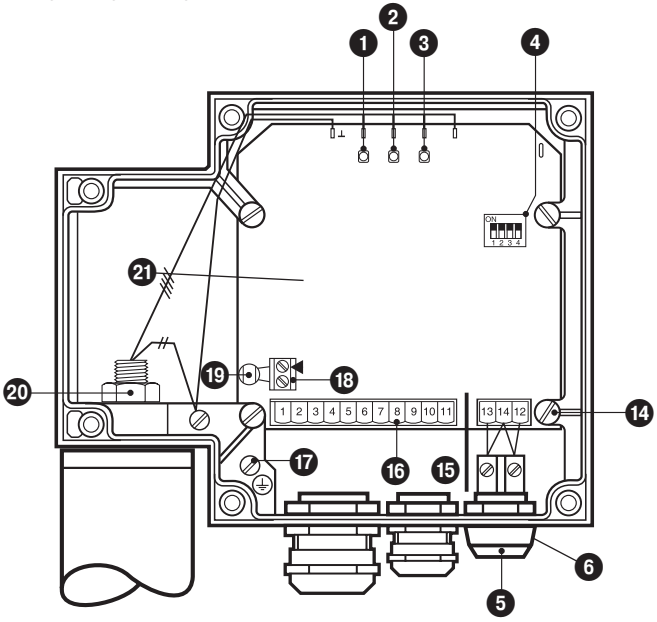

Fig. 5

Dimensions / Functional Elements - continued -

Key

1. LED “MIN alarm”
2. LED “MAX alarm”
3. LED “Pump ON”
4. Code switch for “Response sensititiy”
5. Push button “TEST”
6. Push button “RESET”
7. Thermal insulation, provided on site, ∅ = 20 mm (outside of thermal insulation of steam boiler)
8. Seating surface
9. Joint ring D 33 x 39 DIN ISO 7603-1.4301, bright annealed
10. Screw-in thread G1, EN ISO 228-1
11. Housing screws M4
12. Cable gland PG 9 /PG 11
13. Housing cover
14. Fixing screws for cover plate
15. Separating segment
16. Terminal strip
17. PE connection
18. Terminal strip for testing
19. Thermal fuse T_{max} 102 °C
20. Hexagon nut
21. Cover plate

Installation

NRGS 11-2, NRGS 16-2

1. Determine required measuring lengths of electrode tips and enter data in **table "Functions"**. **Fig. 3**
2. Cut electrode tips [1], [2], [3] and [4] accordingly.
   The electrode tips [1] [2] (low level limiter) must have the same length.
3. Deburr faces of electrode tips.
4. Strip off 50 mm of PTFE insulation from the ends of the electrode tips.
5. Check seating surfaces of threads or flange provided on vessel or boiler standpipe. **Fig. 3**.
   Place supplied joint ring ❾ onto seating surface of the threaded standpipe or flange. **Fig. 3**
6. Use only the joint ring (D 33 x39 DIN 7603-1.4301, bright annealed) supplied with the electrode.
7. Apply a light smear of silicone grease to the electrode thread ❿ (e. g. DOW Corning 111 Compound).
8. Screw compact system into threads or flange provided on vessel and tighten with a 41 mm open-end spanner. The torque required for tightening when cold is 140 Nm.

Table "Functions"

Function	Function	Electrode tip	Length [mm]
Low level alarm		1	
Low level alarm		2	
e. g. pump ON		3	
e. g. pump OFF		4	

Please enter data.

Attention

- Do not subject the electrode tips to shocks and do not bend the electrode tips when mounting. Use only the supplied joint ring D 33 x 39, form D, DIN 7603, made from 1.4301 (bright annealed).
- Do not insulate screw-in thread with hemp or PTFE tape.
- Do not lag electrode body above the hexagonal section.
- Install compact system only in a vertical position!
- The specified torques must be strictly observed.

Note

- For the approval of the boiler standpipe the relevant regulations must be considered.
- Carry out the installation work in compliance with the installation examples given in this installation manual.

Tools

- Open-end spanner A. F. 41 mm
- Bolt cutter
- Hacksaw
- Flat file, cut 2

Examples of installation

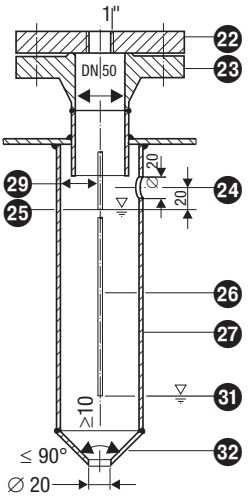

Fig. 6

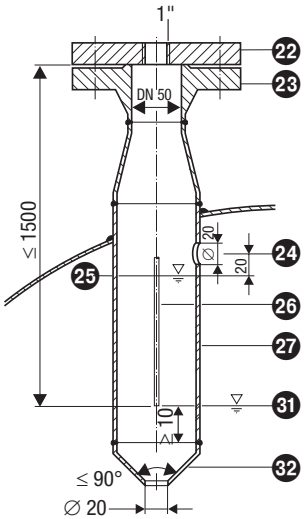

Fig. 7

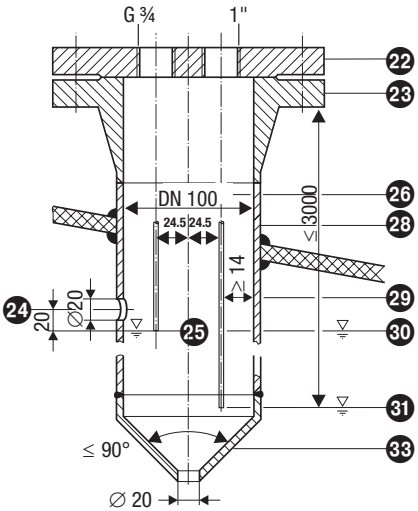

Fig. 8

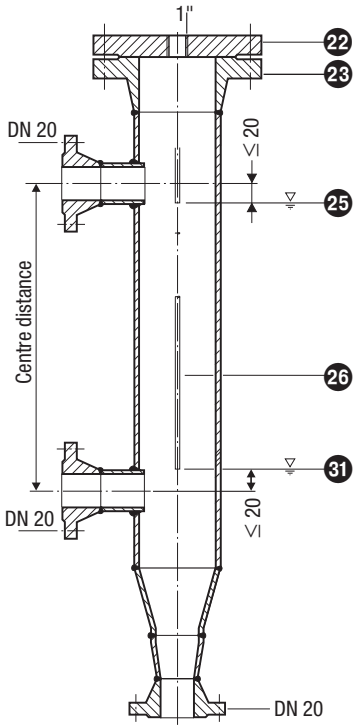

Fig. 9

Key

22 Flange PN 40, DN 50, DIN 2527
Flange PN 40, DN 100, DIN 2527

23 For the approval of the boiler standpipe with connecting flange the relevant regulations must be considered.

24 Vent hole

25 High water HW

26 Electrode tip ∅ = 5 mm

27 Protection tube DN 80

28 Protection tube DN 100

29 Electrode distance ≥ 14 mm

30 Electrode distance ≥ 40 mm

31 Low water LW

32 Reducer DIN 2616, part 2 K-K88. 9 x 3.2-242.4 x 2.6 W

33 Reducer DIN 2616, part 2 K-K114. 3 x 3. 6-648.3 x 2.9 W

Electrical Connection

NRGS 11-2, NRGS 16-2

For mains and control cables you can use multi-core flexible control cable (conductor size 0.75 - 1.5 mm²) .

1. Unscrew housing screws ⓫, remove housing cover ⓭. **Fig. 5**
2. Unscrew union nuts of cable entries ⓬.

The terminal box can be turned through +/– 180 °.

3. Loosen hexagon nut ⓴ with 17 mm open-end spanner but do not remove! **Fig. 6**
4. Turn electrode terminal box into desired direction (+/– 180°).
5. Tighten hexagon nut ⓴ slightly.
6. Remove terminal strips ⓰ from circuit board.
7. Connect terminal strip according to wiring diagram, establish PE connection ⓱.
8. Plug in terminal strips ⓰.
9. Install cable entry ⓬.
10. Put housing cover ⓭ in place, insert and fasten housing screws ⓫.

Wiring diagram

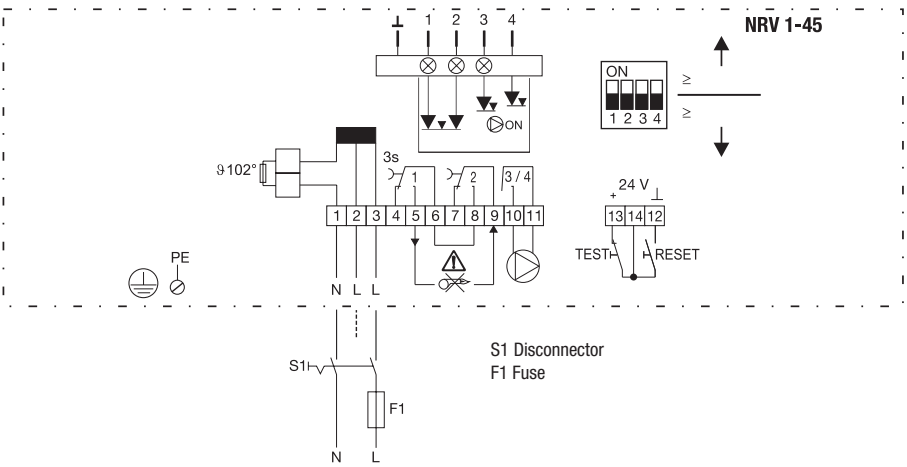

Fig. 10

Electrical Connection - continued -

Attention

- The following relocations of cables with basic insulation are not permissible: Mains and control cables in low voltage areas.
- To prevent the welding together of contacts provide an external slow-blow fuse T 2.5 A for the output contacts.
- Provide inductive loads with RC combinations according to manufacturer's specification to ensure interference suppression.
- Provide an external slow-blow fuse for the compact system: 63 mA for 230 V and 115 V or 150 mA for 24 V.
- Install an easily accessible disconnecting switch for the compact system in the close proximity of the equipment (EN 61010-1).
- Mark respective switch as disconnecting device for the compact system.

Tools

- Screwdriver for cross head screws, size 1
- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680
- Open-end spanner 17 mm A. F.

Sensitivity of response

Factory settings

The equipment features the following factory set default value:

- Response sensitivity ≥ 10µS/cm²

Switch selection of response sensitivity

The response sensitivity can be switch selected between ≥ 0.5 µS/cm and ≥ 10 µS/cm by means of the code switch ❹:

1. Unscrew housing screws ⓫ at the electrode terminal and remove cover ⓭ .
   Fig. 5, Fig. 6
2. Undo fixing screws ⓮ and remove cover plate ㉑ .

   Code switch 1–4 OFF 

   Response sensitivity ≥ 0.5 µS/cm.

   Code switch 1–4 ON 

   Response sensitivity ≥ 10 µS/cm.
3. Put cover plate ㉑ in place and fix it with screws ⓮.
4. Put cover in place ⓭ and fasten housing screws ⓫.

Attention

- Do not damage the electronic components when setting the code switch!
- Do **not** use a graphitic pencil to set the code switch.

Tools

- Screwdriver for cross head screws, size 1
- Screwdriver for slotted screws, size 2.5, completely insulated according to VDE 0680

Commissioning Procedure

Danger

The terminal strip of the NRGS 11-2, NRGS 16-2 is live during operation.
This presents the danger of electric shock!
Cut off power supply before mounting or removing the housing cover!

Checking electrical connection

1. Make sure that the system NRGS 11-2, NRGS 16-2 is wired in accordance with the wiring diagram. **Fig. 11**
2. Make sure that the supply voltage agrees with the specification on the name plate.

Applying mains voltage

1. Apply supply voltage and check that all functions of the respective switchpoints work correctly.
   LEDs ❶, ❷, ❸ are provided for visual check of switchpoints. **Fig. 5**

To check the correct functioning of the LEDs ❶, ❷, ❸ remove the housing cover ⓭. **Fig. 4, Fig. 5**

Checking assignation of switching functions

1. Check the switching function Low level (MIN) alarm of the electrode tips [1] and [2].
   For this test the level in the vessel must fall below the low level mark.
   The low level alarm must then be activated by the level switch after the de-energizing delay has elapsed.
2. Check the switching functions “Pump ON” and “Pump OFF”. See table **“Functions”.**

Checking low level (MIN) alarm

The function of the low level alarm can be simulated by pushing the button “TEST” ❺. **Fig. 5**
Press button “TEST”. After the de-energizing delay a low level alarm must be raised.

Operation

Resetting low level alarm

The heating will be switched off and interlocked. To reset the interlock the MIN electrode tips must enter the water again and the button “Reset” ❻ must be pushed. Hold down the button “Reset” for at least 5 seconds.

Troubleshooting

Fault finding list for troubleshooting

Switchpoint "Pump OFF" exceeded – no function

Fault:	The electronic insert is defective.
Remedy:	Replace the electronic insert with a new one.

Fault:	The screw-in body does not have earth connection to the vessel.
Remedy:	Clean sealing surfaces and insert metal joint ring as shown in the drawing. Do not insulate compact system with hemp or PTFE tape!

Fault:	The compact system is not supplied with voltage.
Remedy:	Switch on supply voltage. Wire equipment according to the wiring diagram.

Fault:	The thermal fuse has been triggered.
Remedy:	The ambient temperature must not exceed 70 °C. Replace thermal fuse.

Fault:	The electrical conductivity is too low.
Remedy:	Set code switch ❹ to ≥ 0.5 µS/cm.

Level below switchpoint "Low level" – no function

Fault:	The vent hole in the protection tube does not exist, is obstructed or flooded.
Remedy:	Check protection tube and, if necessary, provide vent hole.

Fault:	The isolating valves of the external measuring pot are closed.
Remedy:	Open isolating valve.

Fault:	The electrode tips have earth contact.
Remedy:	Check and, if necessary, change position of installation.

Switchpoint has been reached – incorrect function

Fault:	The switching function has not been assigned correctly. Electrode tips have been cut to the wrong size.
Remedy:	Identify electrode supply wires and reconnect the electronic insert accordingly.

If faults occur that are not listed above or cannot be corrected, please contact our service centre or authorized agency in your country.

Exchanging the electronic insert, removing the compact system

Danger

When loosening the equipment steam or hot water might escape!

This presents the risk of severe scalding all over the body!

It is therefore essential not to dismantle the equipment unless the boiler pressure is verified to be 0 bar.

The equipment becomes hot during operation. Touching the hot equipment presents the risk of severe burns to hands and arms. All installation, removal and maintenance work must only be performed when the system is cold.

The terminal strips of the equipment are live during operation.
This presents the danger of electric shock!

Always cut off power supply to the equipment before mounting, removing or connecting the terminal strips!

Exchanging the electronic insert

Before exchanging the electronic insert take the compact system out of service and cut off its voltage supply.

1. Undo the housing screws ⓫ and remove the housing cover ⓭. **(Fig. 4, 5)**
2. Pull the electrode wires off the terminal lugs on the electronic insert.
   Remove all terminal strips apart from terminal strip ⓲ .
3. Undo the PE connection ⓱.
4. Unscrew the fixing screws of the electronic insert and take out the electronic insert.
   The electronic insert is available as spare part type NRV 1-45.
5. Install the new electronic insert in reverse order.

Removing and disposing of the compact system

Before removing the compact system take it out of service and cut off its voltage supply.

1. Undo the housing screws ⓫ and remove the housing cover ⓭. **(Fig. 5, 6)**
2. Detach the connecting wires from the terminal strips and pull the wires out of the cable glands.
3. Undo the PE connection ⓱.
4. Before removing the equipment make sure that is is neither hot nor under pressure.

For the disposal of the equipment observe the pertinent legal regulations concerning waste disposal.

Note

When ordering spare parts or replacement equipment please state the material number indicated on the name plate.

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